WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electrical Code (ANSI C1) and/or any other requirements which may be applicable to the user.

Installation, operation, and maintenance should be performed only by qualified personnel.

TM-110280-3U-1

VOLUME I

OPERATOR'S MANUAL

626-PA-6011

EVENT TIME ACCUMULATOR

Note: Refer to Volume 2 (Service Manual) of TM-110280-3U for maintenance data.

1 May 1984
(Rev. 1 July 1984)
(Rev. 1 Sept. 1985)
(Rev. 1 July 1986)
(Rev. 1 Sept. 1989)
(Rev. B)

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DRANETZ TECHNOLOGIES, INC.
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Edison, New Jersey 08818

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IMPORTANT! CALIBRATION INTERVAL

The recommended calibration interval for this unit is once every 12 MONTHS.

We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact the Dranetz Customer Service Department to obtain an authorization number.

Telephone Number:	(201) 287-3680
Telex Number:	499-7808
TWX Number:	(710) 997-9553
FAX Number:	(201) 248-9240
Cable:	DRANETZ

Then fill out the Repair/Service Order form enclosed in this manual and ship it along with the unit to the Dranetz Customer Service Department. (If this form is missing, ask the Dranetz Customer Service Department for a replacement.)

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The information in this manual has been reviewed and is believed to be entirely reliable. No responsibility, however, is assumed for any inaccuracies. The material in this manual is for information purposes only, and is subject to change without notice.

VOLUME 1
OPERATOR'S MANUAL

626-PA-6011 EVENT TIME ACCUMULATOR

SECTION I
GENERAL INFORMATION

1.1 SCOPE

This manual consists of two volumes. Volume 1, the Operator's manual, is divided into three sections: I) GENERAL INFORMATION, II) INSTALLATION AND OPERATION, and III) OPERATIONAL TEST. Volume 2, the Service manual, contains the maintenance instructions.

1.2 INTRODUCTION

This section provides operating instructions for the 626-PA-6011 Event Time Accumulator Plug-in, hereinafter referred to as the 6011. The 6011 is designed for installation in the Series 626 Universal Disturbance Analyzer. It is assumed that the reader is familiar with the mainframe information presented in Volume 1 of the mainframe manual.

1.3 PURPOSE

The 6011 monitors the state of up to 8 inputs. It senses, identifies and records, in a convenient alphanumeric printout, rapid state changes of such inputs as electro-mechanical or solid-state relays with a response time of 1 millisecond. The time between change of states is also recorded, and the total time spent in a given state is also accumulated. The 6011 provides highly accurate and reliable time sequence information, even from extremely noisy sources.

1.4 EQUIPMENT CHARACTERISTICS

The 6011 is configured as a plug-in module 6.5" high by 1.25" wide by 10" deep. It is designed for installation in any of the five slots of the Series 626. Technical specifications of the 6011 appear in Table 1-1.

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Table 1-1. 626-PA-6011 Technical Specifications

No. of Inputs	8
Input	
Impedance	2 wire differential 1 Megohm to ground (each side)
"On" State	2.30 Vdc Max.
"Off" State	1.80 Vdc Min.
Hysteresis	0.10 Vdc Min.
Max Input	+200 Vdc on an input
Min Response Time	1.2 mSec (min. resolution = 10 mSec)
Min. validation time	Program selectable*: 5, 10, 20, or 320 mSec
Normal polarity	Individual inputs selectable to be normally open (off) or normally closed (on)
Elapsed or accumulated time	Individual inputs selectable to accumulated time in Alarm or Normal (Accuracy = ±2%)
System Check	Temporarily disables externally applied inputs and causes all inputs to change states twice, checking input amplifiers, debounce filters, change of state and interrupt logic. Faulty inputs produce fault messages indicating faulty circuits.
Printout Modes	Printout
Normal	Channel No., input No., present state and time, plus accumulated time (where appropriate)
Maximum Detail	Same as NORMAL
Daily (Data) Summary	Channel No., input No., present state, number of transitions to A or N, total time accumulated in A or N
Short Term Summary	Same as daily summary w/o present state
Program Summary	Channel No., module type, minimum (debounce) time, normal polarity state and elapsed time polarity
Preset	5 mSec debounce time, all inputs N/O, accumulated alarm time.

---

*Jumper selectable to 40, 80, 160, or 320 mSec.

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1.5 STANDARD ACCESSORIES

Model No.	Part No.	Quantity	Description
626-PA-6011 (Vol. 1)	TM-110280-3U	1	Operating Manual
	AMP 1-350352-9	8	Connector Housing
	AMP 640545-1	24	Connector Pin
	110289	1	Instruction Decal

1.6 OPTIONAL ACCESSORIES

Model No.	Part No.	Quantity	Description
626-PA-6011 (Vol. 2)	TM-110280-3U	1	Service (Maintenance) Manual

1.7 FACTORY REPAIR

When factory repair is required, proceed as follows:

1. Contact the Dranetz Customer Service Department in order to obtain an Authorization Number for factory repair.

   Telephone No: (201) 287-3680

   TWX: (710) 997-9553

   FAX: (201) 248-9240

   Telex: 499-7808

   Cable: DRANETZ

2. Fill out the REPAIR/SERVICE ORDER form enclosed in the Series 626 Operating Manual. Ship it along with the malfunctioning equipment to the Dranetz Customer Service Department.

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SECTION II
INSTALLATION AND OPERATION

2.1 INSTALLATION

To install the 6011 in the mainframe, proceed as follows:

CAUTION

Be sure 626 is turned off and that all power connected to all plug-in modules is turned off.

a. Position the top and bottom front corners of the plug-in module in the upper and lower tracks at the desired slot position at the rear of the mainframe.

b. Carefully slide the module into the mainframe until it is firmly seated.

c. Tighten the top and bottom captive screws to secure the module to the mainframe.

2.1.1 Load Ratings

The Series 626 standard mainframe has an upper limit of the combined total rating of the installed modules. The overall mainframe capacity is set at 20 units, and individual modules have load ratings as follows:

Plug-in	Load Rating	Plug-in	Load Rating
626-PA-6001	2 Units	626-PA-60012A	3 Units
626-PA-6001 with Extra Option Board	3 Units	626-PA-6013	2 Units
		626-PA-6014	1 Unit
		626-PA-6015	4 Units
626-PA-6002	2 Units	626-PA-6018	4 Units
626-PA-6003	4 Units	626-PA-6020	4 Units
626-PA-6005	2 Units	626-PA-6024A	4 Units
626-PA-6006	2 Units	626-PA-6024B	4 Units
626-PA-6007	1 Unit	626-PA-6025	4 Units
626-PA-6008	2 Units	626-PA-6030	6 Units
626-PA-6009	4 Units	626-PA-6037	1 Unit
626-PA-6011	1 Unit	626-PA-6038	1 Unit
626-PA-6012	2 Units	626-PA-6040	6 Units

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NOTE

When selecting modules for installation into any Series 626 Mainframe, verify that the sum of the load ratings of the installed modules DOES NOT exceed 20 Units.

2.2 CONNECTING INPUT CHANNELS

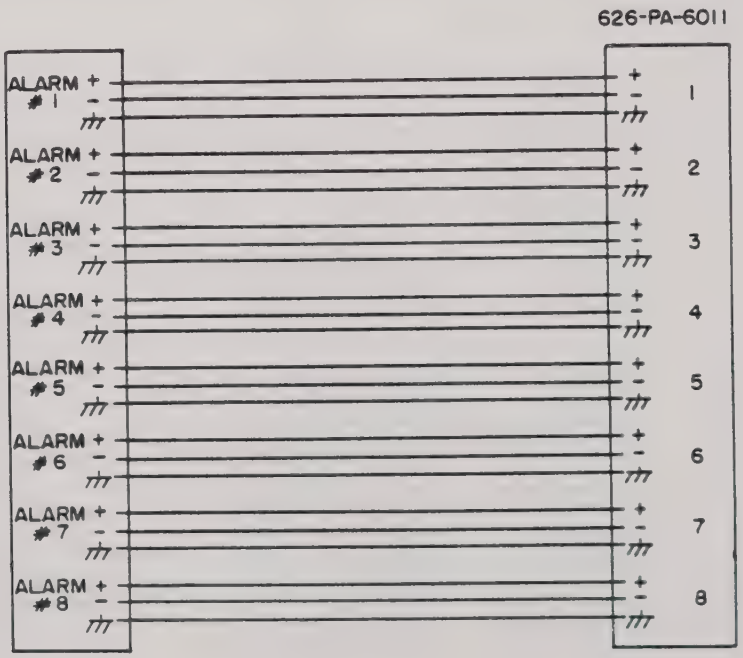
2.2.1 Connection Procedure

The 6011 is equipped with eight 3-pin connectors installed at the rear of the module. The input leads must be wired to the mating connectors supplied with the module, observing the polarity as marked on the rear panel. Attach each wired mating connector to the corresponding (1-8) rear panel connector.

CAUTION

To avoid damaging the equipment, do not apply DC voltages in excess of 200V to the 6011.

2.2.2 Circuit Applications



Connection to Backplane Alarm Signals
(No Separate Contact Supply Required)

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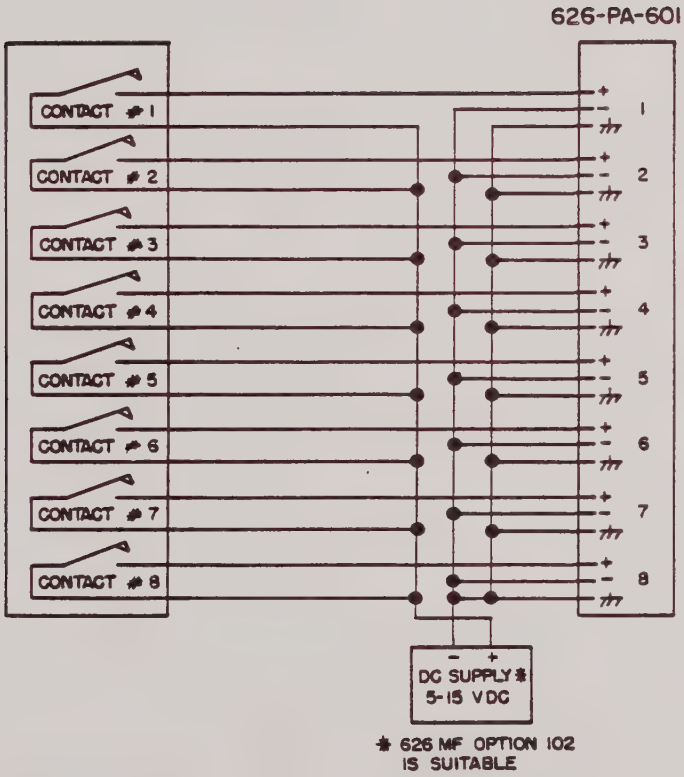

Connection to Relay Contacts
(Separate Contact Supply Required)

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2.3 OPERATING THE 6011

2.3.1 Operational Description

The 6011 records and prints out any change of state of any of its eight inputs. Inputs can be programmed to be "normally closed" (or "high" or "on") or "normally open" (or "low" or "off") in accordance with the application. Minimum validation time is also program selectable to 5 mSec, 10 mSec or 320 mSec. Elapsed time is programmable to accumulate time spent in either the normal or alarm state. Both input state and validation parameters are stored in CMOS Random Access Memory so they are maintained when the 626 is turned off.

When any input changes state, the change data and alarm/normal status of all the inputs are stored, and the appropriate time accumulation action is taken. Depending on the printout mode selected, the channel number, alarm/normal status, and time of change and where appropriate, the time duration of the event are printed out. The number of transitions to the alarm state is also stored and printed out during data summary (along with present state). The total time spent in either the alarm or normal (programmed) state for that day, up until the printout time, is also printed. If a memory overflow occurs, only the transition count is updated. The transition count is stored in the short term accumulator and is printed out for those inputs that change state during the overflow condition when the overflow condition is cleared.

There are three input terminals: +, -, and GND. Since the maximum common mode voltage is ±200V DC, maximum inputs from ground are as follows:

positive input = 200 VDC, negative input = 197 VDC; or
positive input = -197 VDC, negative input = -200 VDC.

The inputs actually change state as follows:

ON = 2.30 VDC Max.
OFF = 1.80 VDC Min.
Hysteresis = 0.10 VDC Min.

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2.3.2 Operating Controls and Indicators

The functions of the mainframe operating controls and indicators associated with 6Ø11 operation are described in Table 2-1. Figure 2-1 shows the typical front panel controls associated with the 6Ø11. For a description of controls common to overall Series 626 operation, refer to Volume 1 of the mainframe manual.

Table 2-1. 6Ø11 Operating Controls

Item	Function
F SENS pushbutton	Used in interactive program to change minimum validation time.
SENS pushbutton	Used in interactive program to change polarity of input states.
IMP SENS pushbutton	Used in interactive program to change the ETA (Elapsed Time Accumulated) mode of the inputs.
DATA pushbutton	When depressed, produces data summary printout.

2.3.3 Programming Procedure

Assume that it is desired to program the eight inputs of a 6Ø11 as follows:

Minimum Validation Time: 1Ø mSec

Input	1	2	3	4	5	6	7	8
Polarity	1	Ø	1	Ø	Ø	Ø	Ø	Ø
ETA Mode	1	1	Ø	Ø	1	Ø	1	Ø

where the polarity code is defined as follows:

1 = N/C or on
Ø = N/O or off

and the ETA mode is defined as:

1 = Elapsed time in Alarm state, and
Ø = Elapsed time in Normal state.

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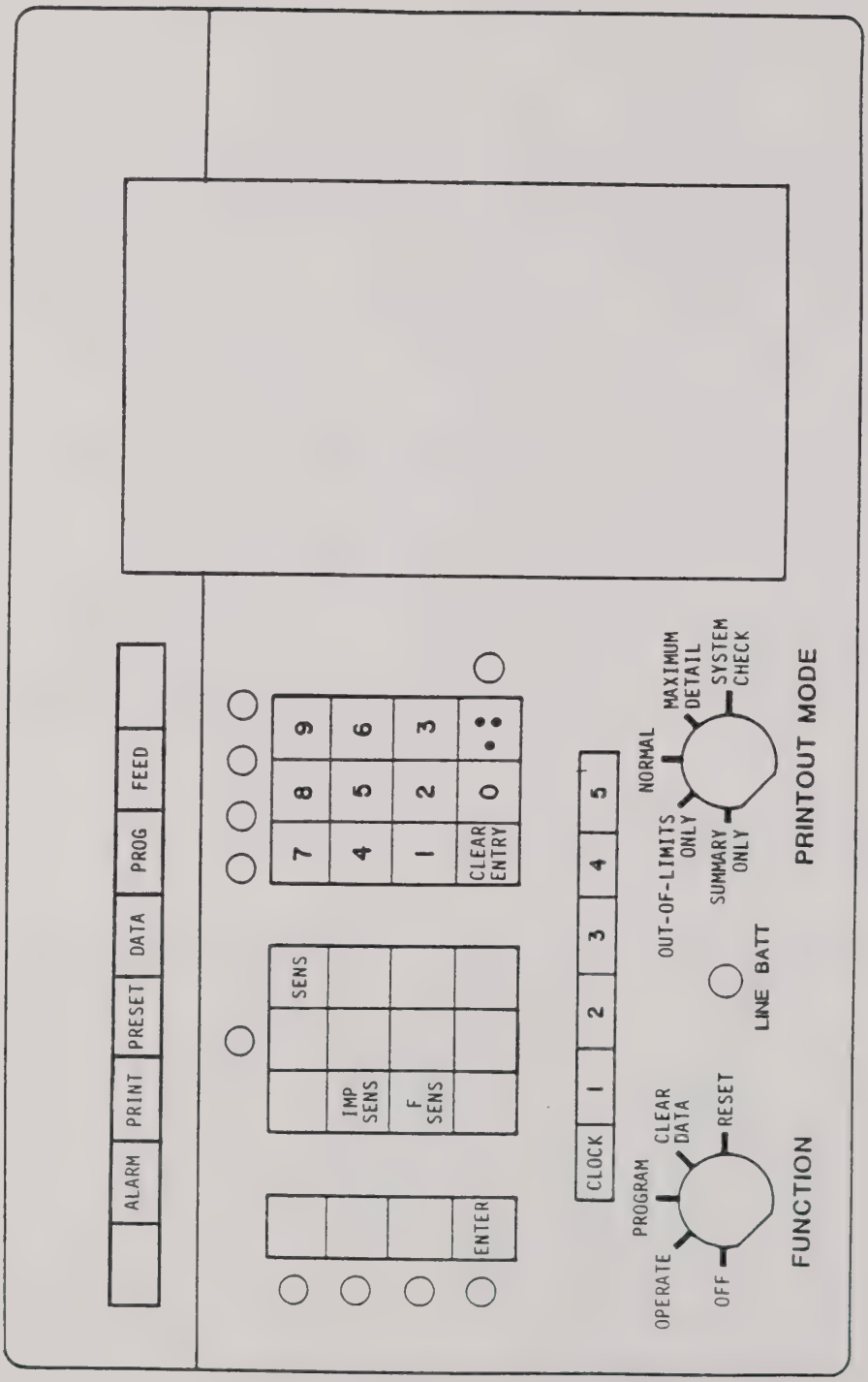

Figure 2-1. Series 626 Controls Used by the 6011 Plug-In

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Program the 6011 as follows:

a. Set the FUNCTION switch to PROGRAM and depress the pushbutton (1-5) that corresponds to the slot position of the 6011 plug-in to be programmed. As shown in the typical printout of figure 2-2, a program summary is printed out, followed by prompt message #1. This message permits the operator to change minimum validation time, any or all input polarities, or any or all ETA modes.

b. To reprogram minimum validation time, press the F SENS pushbutton. This causes prompt message #2 to be generated. Now press "2". Note that program summary #2 is printed with minimum time updated to 10 mSec.

c. Prompt message #1 automatically follows the updated program summary. To change polarity, press the SENS pushbutton. This causes prompt message #3 to be generated. Enter the desired polarities: 1 0 1 0 0 0 0 0.

Note that program summary #3 is printed with both minimum validation time and polarity update.

d. Prompt message #1 again follows the program summary. To change the ETA modes, depress the IMP SENS pushbutton. This causes prompt message #4 to be generated. Enter the desired ETA modes:

1 1 0 0 1 0 1 0.

Note that program summary #4 is generated, with all three programmable parameters updated as desired. Another prompt #1 message is also generated, enabling further changes to be made, if desired.

2.4 SELECTING THE FACTORY/OPTION 101 PRESET PROGRAM

NOTE: Custom Preset Option 101 allows the user to choose his/her own program for the PRESET function.

To select the program stored in non-volatile memory, set the FUNCTION switch to PROGRAM and depress the channel number desired. The last operator-set program will be printed out. Now depress the PRESET pushbutton to recall the factory-set program. Unless specially modified to customer requirements, the factory-set program for the 6011 is as follows:

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626

```
TO CHANGE ETA MODE
PRESS:  'IMP SENS'
TO CHANGE POLARITY
PRESS:   'SENS'
TO CHANGE MIN TIME
PRESS:   'F SENS'

T 1 1 1 1 1 1 1 1
P 0 0 0 0 0 0 0 0
# 1 2 3 4 5 6 7 8

MIN TIME=005 MSEC

   626-PA-6011


TO CHANGE ETA MODE
PRESS:   'IMP SENS'
TO CHANGE POLARITY
PRESS:   'SENS'
TO CHANGE MIN TIME
PRESS:   'F SENS'

T 1 0 0 1 1 1 0 1
P 1 0 1 1 0 1 1 0
# 1 2 3 4 5 6 7 8

MIN TIME=020 MSEC

   626-PA-6011
       CH 4
PROGRAM SUMMARY

  PROGRAM MODE
```

626A,G,R,ARA

```
  PROGRAM MODE

PROGRAM SUMMARY
       CH 4
   626-PA-6011

MIN TIME=020 MSEC

# 1 2 3 4 5 6 7 8
P 1 0 1 1 0 1 1 0
T 1 0 0 1 1 1 0 1

PRESS:   'F SENS'
TO CHANGE MIN TIME
PRESS    'SENS'
TO CHANGE POLARITY
PRESS:   'IMP SENS'
TO CHANGE ETA MODE


   626-PA-6011

MIN TIME=005 MSEC

# 1 2 3 4 5 6 7 8
P 0 0 0 0 0 0 0 0
T 1 1 1 1 1 1 1 1

PRESS:   'F SENS'
TO CHANGE MIN TIME
PRESS:   'SENS'
TO CHANGE POLARITY
PRESS:  'IMP SENS'
TO CHANGE ETA MODE
```

2.5 DESCRIPTION OF PRINTOUTS

With the plug-in module programmed and the FUNCTION switch set to OPERATE, a change of state detected in any of the eight inputs to the 6011 produces a printout. A sample printout appears in figure 2-3. This readout shows inputs that were programmed to measure accumulated time while in the alarm state. The first group shown is the Event Data Printout; the first three lines in this group constitute Event Printout #1. The second group of printouts is the Summary Mode. Each event in the event data printout occupies three lines. In event printout #1, input 6 of channel 1 changed to the alarm state at 20:48:30.41 (first line) and remained there until 20:48:34.55 (third line). The second line indicates that the Elapsed Time (ET) in the Alarm (A) state was less than 0.1 minute. (Maximum time for the ET entry is 999.9 minutes.)

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Note that the Elapsed Time for input 6 appears as 0000.0 minutes in later printouts. This occurs if the inputs change at a rate faster than can be printed. In such cases, only the first elapsed time interval is shown (AET = < 0.1 MIN); the following ET printouts are set to 0000.0 MIN.

If the change state activity increases to a very high level, producing a memory overflow condition, the 6011 initiates a summary mode. The summary indicates the number of alarm transitions that occurred during the overflow interval. In this case, 19, 30, and 40 alarm "hits" were detected in inputs 6, 7, and 8, respectively. Note that for this summary, only those inputs that change are printed; no activity was detected in inputs 1 through 5 of this example.

When the PRINTOUT MODE switch is set to SYSTEM CHECK, board status is checked and a system check printout is produced. (See figure 2-4.) Refer to Section III of this manual for a description of the system check feature.

Note: The 6011 WILL NOT pass the System Check if programmed to 320 mSec minimum validation time. Any error causes the board to be turned off until the error is corrected or the unit is reset. The DATA SUMMARY will display "BD OFF" as well as the usual message.

To obtain a program summary of the plug-ins installed in the Series 626, set the FUNCTION switch to OPERATE and depress the PROG pushbutton. The program summary for the 6011 is shown in figure 2-4. The summary shows the time, channel number, module type, programmed polarity, and ETA mode for each input.

The data summary is obtained by depressing the DATA pushbutton. For each input, the printout indicates the number of alarm transitions (if any) as well as the present state. (See figure 2-4.) The total time (TT) in the alarm state (or normal state, if so programmed) is also shown. (The maximum time possible for the TT printout is 1440 minutes (24 hours); this value is reset to 0000.0 at midnight.)

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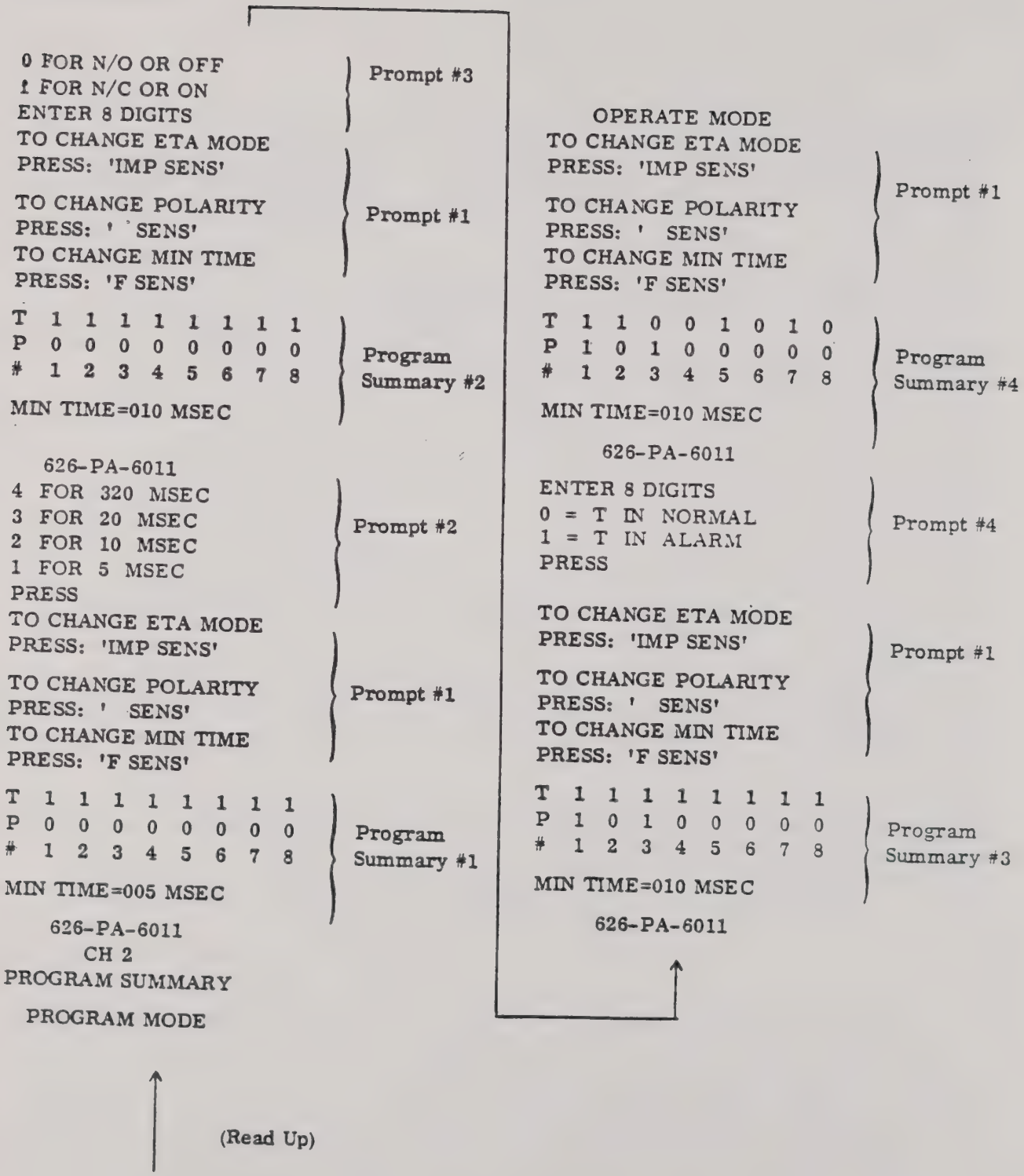

Figure 2-2A. Typical Programming Sequence - Model 626

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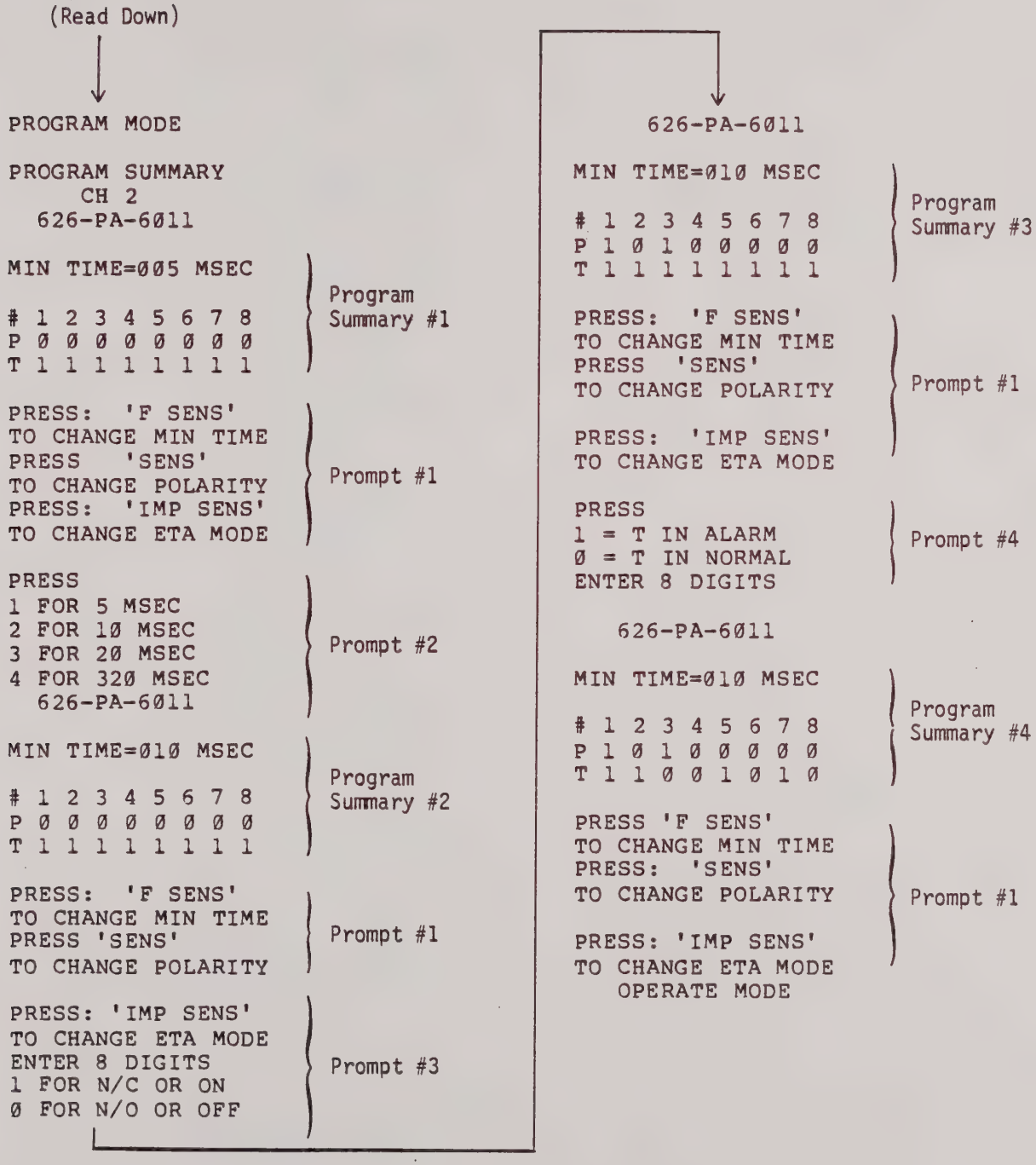

Figure 2-2B. Typical Programming Sequence, Models 626A,G,R,ARA

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626

```
#8 0040 ALARM HIT
#7 0030 ALARM HIT
#6 0019 ALARM HIT

   626-PA-6011
      CH 2

   SUMMARY MODE


1  #6 N 20:50:44.00
   AET = 0000.0 MIN

1  #6 A 20:50:43.96

1  #6 N 20:50:43.84
   AET = <0.1 MIN

1  #6 A 20:50:43.79

1  #6 N 20:50:33.67
   AET = 0001.4 MIN

1  #6 A 20:49:06.20

2  #1 N 19:36:28.52
   AET = <0.1 MIN

2  #1 A 19:36:28.37

1  #6 N 20:48:43.55
   AET = 0000.2 MIN

1  #6 A 20:48:30.41
```

626A,G,R,ARA

```
1  #6 A 20:48:30.41

   AET = 0000.2 MIN
1  #6 N 20:48:43.55

2  #1 A 19:36:28.37

   AET = <0.1 MIN
2  #1 N 19:36:28.52

1  #6 A 20:49:06.20

   AET = 0001.4 MIN
1  #6 N 20:50:33.67

1  #6 A 20:50:43.79

   AET = <0.1 MIN
1  #6 N 20:50:43.84

1  #6A 20:50:43.96

   AET = 000.0 MIN
1  #6 N 20:50:44.00


   SUMMARY MODE

      CH 2
   626-PA-6011

#6 0019 ALARM HIT
#7 0030 ALARM HIT
#8 0040 ALARM HIT
```

Figure 2-3. Event Data and Summary Mode Printouts

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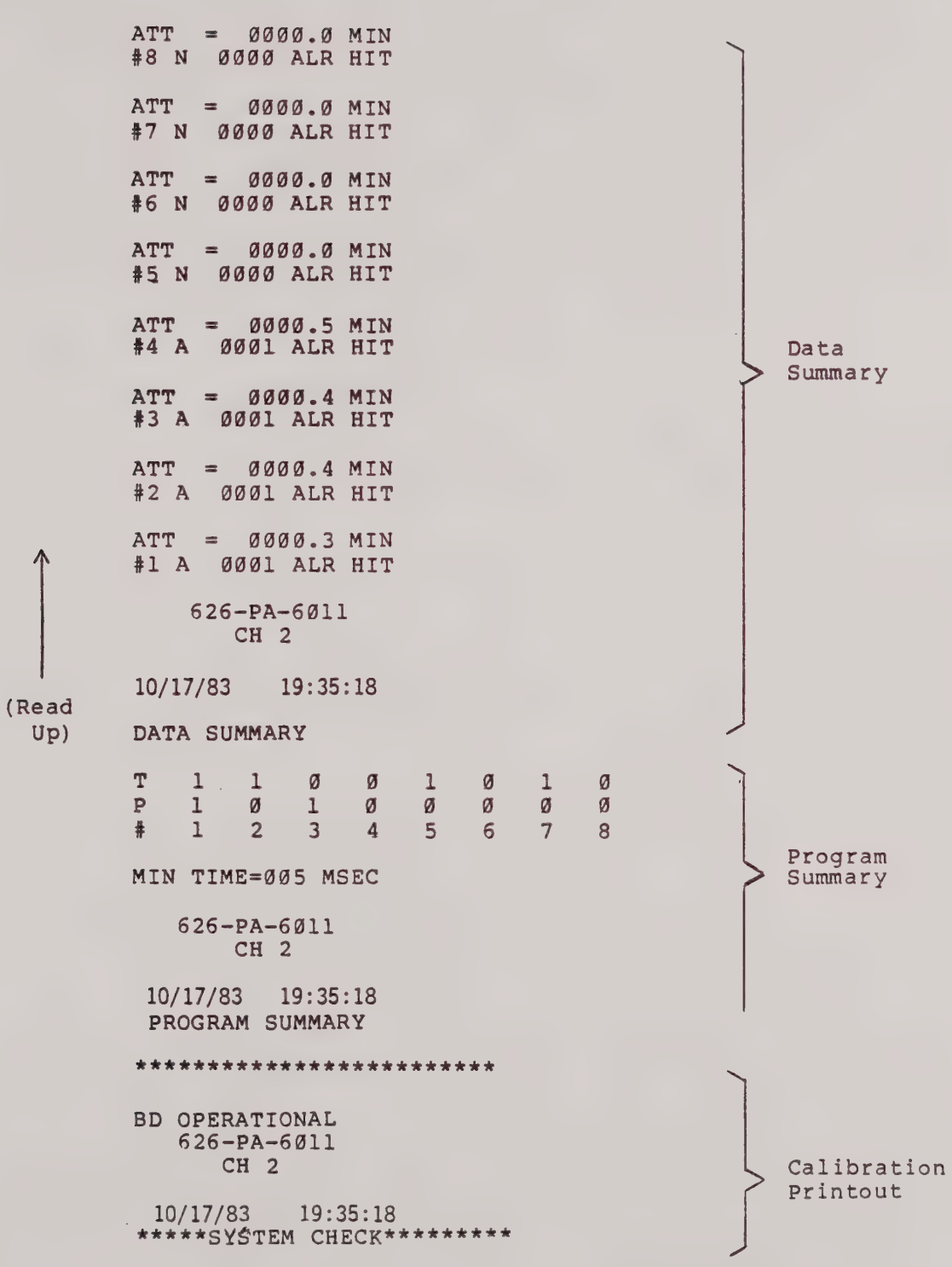

Figure 2-4A. System Check, Program Summary and Data Summary Printouts (Model 626)

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```
******SYSTEM CHECK******
  10/17/83   19:35:18
        CH 2
     626-PA-6011
    BD OPERATIONAL

************************

   PROGRAM SUMMARY
 10/17/83  19:35:18

       CH 2
    626-PA-6011

MIN TIME=005 MSEC

# 1 2 3 4 5 6 7 8
P 1 0 1 0 0 0 0 0
T 1 1 0 0 1 0 1 0

DATA SUMMARY

10/17/83   19:35:18

       CH 2
    626-PA-6011

#1  A  0001 ALR HIT
ATT  =   0000.3 MIN

#2  A  0001 ALR HIT
ATT  =   0000.4 MIN

#3  A  0001 ALR HIT
ATT  =   0000.4 MIN

#4  A  0001 ALR HIT
ATT  =   0000.5 MIN

#5  N  0000 ALR HIT
ATT  =   0000.0 MIN

#6  N  0000 ALR HIT
ATT  =   0000.0 MIN

#7  N  0000 ALR HIT
ATT  =   0000.0 MIN

#8  N  0000 ALR HIT
ATT  =   0000.0 MIN
```

Calibration Printout

Program Summary

(Read Down)

Data Summary

Figure 2-4B. System Check, Program Summary and Data Summary Printouts (Models 626A,G,R,ARA)

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2.6 ASSEMBLING CABLES FOR 626-PA-6011

To attach the wires to the pins provided in the accessory bag for use with the 626-PA-6011, AMP tool #90325-1 is recommended. If this tool is not available, the following procedure may be used instead.

1) Take the three conductor twisted pair of red, green and black 24 AWG wires and untwist the 2 inches at one end.

2) Strip the insulation back 1/2" ± 1/16" and tin the wires.

3) Insert the wire into the pin until 1/8" of insulation is touching the pin (so edge of insulation is even with the first outer set of tabs). Bend these tabs tightly over the insulated wire, one at a time, with a needle-nose pliers.

4) Bend the inner tabs tightly over the stripped wire, one at a time, with a needle-nose pliers.

5) Apply a soldering iron to the inner tab. After heating for several seconds, apply a small amount of rosin core solder to the point of contact. Let flow for several seconds and remove soldering iron. Do not heat too long or the insulation may melt.

6) Repeat for the remaining 2 wires in the group.

7) When the pin has cooled, insert the pins into the connectors provided as follows, until a click is felt.

a. Red wire into hole marked #1.
b. Black wire into hole marked #2.
c. Green wire into hole marked #3.

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SECTION III
OPERATIONAL TEST

3.1 GENERAL

This section provides information for performing an operational test to verify that the 6009 plug-in is operating properly.

3.2 SYSTEM CHECK

When the PRINTOUT MODE switch is set to SYSTEM CHECK, board status is checked and a system check printout is produced. If the 6011 plug-in module is determined to be good, a system check printout such as that shown below is produced.

626	626A,G,R,ARA
**********	*******SYSTEM CHECK*********
BD OPERATIONAL	10/17/83 19:35:18
626-PA-6011	CH 2
CH 2	626-PA-6011
10/17/83 19:35:18	BD OPERATIONAL
*******SYSTEM CHECK*********	**********

If an abnormal condition is detected, the line BD OPERATIONAL may be replaced by one of the following:

INTERRUPT

INPUT ERROR

DATA ERROR

The 6011 cannot be calibrated if programmed to 320 mSec minimum validation time. Any error causes the board to be turned off until the error is corrected or the unit is reset. The DATA SUMMARY will display "BD OFF" as well as the usual message.

Note that the system check printout starts and ends with asterisks.

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